

Fertilizer (Mixing Only) Manufacturing: 2002

Issued December 2004

EC02-311-325314 (RV)

2002 Economic Census

Manufacturing

Industry Series



USCENSUSBUREAU

Helping You Make Informed Decisions

U.S. Department of Commerce
Economics and Statistics Administration
U.S. CENSUS BUREAU



CONTENTS

Introduction to the Economic Census	v
Manufacturing	ix

Tables

1. Historical Statistics for the Industry: 2002 and Earlier Years ...	1
2. Industry Statistics for Selected States: 2002	2
3. Detailed Statistics by Industry: 2002	3
4. Industry Statistics by Employment Size: 2002.....	4
5. Industry Statistics by Primary Product Class Specialization: 2002	5
6a. Products Statistics: 2002 and 1997	6
6b. Product Class Shipments for Selected States: 2002 and 1997 .	--
7. Materials Consumed by Kind: 2002 and 1997.....	8

Appendixes

A. Explanation of Terms	A-1
B. NAICS Codes, Titles, and Descriptions	B-1
C. Methodology	C-1
D. Geographic Notes	--
E. Metropolitan and Micropolitan Statistical Areas	--
F. Comparability of Product Classes and Product Codes: 2002 to 1997	F-1

-- Not applicable for this report.

Table 1. Historical Statistics for the Industry: 2002 and Earlier Years

[Data based on the 2002 Economic Census and the 2002 Annual Survey of Manufactures (ASM). For information on confidentiality protection, sampling error, nonsampling error, and explanation of terms, see note at end of table. For meaning of abbreviations and symbols, see introductory text]

Industry and year ¹	Com- panies ²	All estab- lish- ments ³	All employees		Production workers			Value added (\$1,000)	Total cost of materials (\$1,000)	Total value of shipments (\$1,000)	Total capital expendi- tures (\$1,000)
			Number ⁴	Payroll (\$1,000)	Number ⁴	Hours (1,000)	Wages (\$1,000)				
325314, Fertilizer (mixing only) manufacturing	2002.. 373	542	10 083	340 665	6 290	13 759	179 697	1 112 499	1 982 160	3 090 683	125 387
	2001.. N	N	9 188	342 740	5 253	11 552	169 850	956 066	2 100 854	3 150 959	134 044
	2000.. N	N	9 275	344 877	5 441	11 176	171 923	1 073 239	2 069 319	3 106 936	127 249
	1999.. N	N	8 996	289 584	5 624	11 437	151 411	967 520	1 923 173	2 897 001	120 939
	1998.. N	N	9 371	252 637	6 461	12 612	145 710	1 188 881	2 485 371	3 651 016	55 314
	1997.. 334	449	8 857	236 940	6 038	12 554	135 182	1 023 171	2 320 091	3 323 819	71 131

¹Statistics presented for years ending in 2 and 7 are census data. Interim census years are derived in a representative sample of manufacturing establishments canvassed in the Annual Survey of Manufactures (ASM).

²For the census, a company is defined as a business organization consisting of one establishment or more under common ownership or control.

³Includes establishments with payroll at any time during the year.

⁴Number of employees figures represent average number of production workers for pay period that includes the 12th of March, May, August, and November plus other employees for payroll period that includes the 12th of March.

Note: The data in this table are based on the 2002 Economic Census and the 2002 Annual Survey of Manufactures (ASM). To maintain confidentiality, the Census Bureau suppresses data to protect the identity of any business or individual. The census results in this table contain sampling errors and nonsampling errors. Data users who create their own estimates using data from American FactFinder tables should cite the Census Bureau as the source of the original data only. For explanation of terms, see Appendix A. For full technical documentation, see Appendix C.

Table 2. Industry Statistics for Selected States: 2002

[States that are a disclosure or with less than 100 employees are not shown. Data based on the 2002 Economic Census. For information on confidentiality protection, nonsampling error, explanation of terms, and geographical definitions, see note at end of table. For information on geographic areas followed by *, see Appendix D. For meaning of abbreviations and symbols, see introductory text]

Industry and geographic area	E ¹	All establishments ²		All employees		Production workers			Value added (\$1,000)	Total cost of materials (\$1,000)	Total value of shipments (\$1,000)	Total capital expenditures (\$1,000)
		Total	With 20 employees or more	Number ³	Payroll (\$1,000)	Number ³	Hours (1,000)	Wages (\$1,000)				
325314, Fertilizer (mixing only) manufacturing												
United States	1	542	148	10 083	340 665	6 290	13 759	179 697	1 112 499	1 982 160	3 090 683	125 387
Alabama	2	13	5	466	15 971	355	729	10 284	46 634	81 769	125 036	6 500
California	3	42	15	1 027	32 950	621	1 428	17 088	120 012	141 953	261 378	10 705
Florida	2	43	20	1 109	43 538	681	1 582	21 784	115 619	316 992	433 130	19 516
Illinois	1	16	5	249	7 325	154	353	4 387	33 025	52 252	84 743	2 067
Maryland	—	15	2	145	4 236	104	244	2 773	13 008	23 979	38 024	984
Michigan	1	10	5	267	7 920	194	349	4 833	29 394	27 583	55 661	1 824
New Jersey	3	19	4	223	8 643	131	265	3 513	21 410	31 509	52 340	1 642
Pennsylvania	1	25	6	423	16 368	256	499	8 276	45 027	100 602	143 889	5 671
Texas	1	56	11	890	28 473	561	1 224	14 252	100 546	123 420	221 368	23 528
Virginia	3	20	6	261	8 157	164	344	3 867	20 166	40 874	63 145	1 458
Washington	2	16	4	195	6 047	130	266	4 213	13 993	32 656	46 556	2 390

¹Some payroll and sales data for small single-establishment companies with up to 20 employees (cutoff varied by industry) were obtained from administrative records of other government agencies rather than from census report forms. These data were then used in conjunction with industry averages to estimate statistics for these small establishments. This technique was also used for a small number of other establishments whose reports were not received at the time data were tabulated. The following symbols are shown where estimated data account for 10 percent or more of the figures shown: 1—10 to 19 percent; 2—20 to 29 percent; 3—30 to 39 percent; 4—40 to 49 percent; 5—50 to 59 percent; 6—60 to 69 percent; 7—70 to 79 percent; 8—80 to 89 percent; 9—90 percent or more.

²Includes establishments with payroll at any time during the year.

³Number of employees figures represent average number of production workers for pay period that includes the 12th of March, May, August, and November plus other employees for payroll period that includes the 12th of March.

Note: The data in this table are based on the 2002 Economic Census. To maintain confidentiality, the Census Bureau suppresses data to protect the identity of any business or individual. The census results in this table contain nonsampling errors. Data users who create their own estimates using data from American FactFinder tables should cite the Census Bureau as the source of the original data only. For explanation of terms, see Appendix A. For full technical documentation, see Appendix C. For geographical definitions, see Appendix D.

Table 3. Detailed Statistics by Industry: 2002

[Data based on the 2002 Economic Census and the 2002 Annual Survey of Manufactures (ASM). For information on confidentiality protection, sampling error, nonsampling error, and explanation of terms, see note 2 at end of table. For meaning of abbreviations and symbols, see introductory text]

Item	Value
325314, Fertilizer (mixing only) manufacturing	
Companies ¹	number.. 373
All establishments ²	number.. 542
Establishments with 1 to 19 employees	number.. 394
Establishments with 20 to 99 employees	number.. 136
Establishments with 100 employees or more	number.. 12
All employees ³	number.. 10 083
Total compensation	\$1,000.. 415 543
Annual payroll	\$1,000.. 340 665
Total fringe benefits	\$1,000.. 74 878
Production workers, average for year	number.. 6 290
Production workers on March 12	number.. 6 650
Production workers on May 12	number.. 6 563
Production workers on August 12	number.. 6 004
Production workers on November 12	number.. 5 877
Production worker hours	1,000.. 13 759
Production worker wages	\$1,000.. 179 697
Total cost of materials	\$1,000.. 1 982 160
Materials, parts, containers, packaging, etc., used	\$1,000.. 1 688 821
Resales	\$1,000.. 243 538
Purchased fuels	\$1,000.. 20 282
Purchased electricity	\$1,000.. 17 784
Contract work	\$1,000.. 11 735
Quantity of electricity purchased for heat and power	1,000 kWh.. 311 257
Quantity of electricity generated less sold for heat and power	1,000 kWh.. -
Total value of shipments	\$1,000.. 3 090 683
Primary products value of shipments	\$1,000.. 2 742 463
Secondary products value of shipments	\$1,000.. 53 279
Total miscellaneous receipts	\$1,000.. 294 941
Value of resales	\$1,000.. 285 907
Contract receipts	\$1,000.. 2 511
Other miscellaneous receipts	\$1,000.. 6 523
Primary products specialization ratio	percent.. 98
Value of primary products shipments made in all industries	\$1,000.. 2 854 157
Value of primary products shipments made in this industry	\$1,000.. 2 742 463
Value of primary products shipments made in other industries	\$1,000.. 111 694
Coverage ratio	percent.. 96
Value added	\$1,000.. 1 112 499
Total inventories, beginning of year	\$1,000.. 391 158
Finished goods inventories	\$1,000.. 226 519
Work-in-process inventories	\$1,000.. 24 109
Materials and supplies inventories	\$1,000.. 140 530
Total inventories, end of year	\$1,000.. 401 795
Finished goods inventories	\$1,000.. 224 663
Work-in-process inventories	\$1,000.. 29 941
Materials and supplies inventories	\$1,000.. 147 191
Gross value of depreciable assets (acquisition costs) at beginning of year	\$1,000.. ¹ 212 504
Total capital expenditures (new and used)	\$1,000.. ¹ 25 387
Buildings and other structures (new and used)	\$1,000.. ¹ 26 739
Machinery and equipment (new and used)	\$1,000.. ¹ 98 648
Automobiles, trucks, etc., for highway use	\$1,000.. ¹ 15 708
Computers and peripheral data processing equipment	\$1,000.. ¹ 3 696
All other expenditures for machinery and equipment	\$1,000.. ¹ 79 244
Total retirements	\$1,000.. ¹ 97 000
Gross value of depreciable assets at end of year	\$1,000.. ¹ 240 891
Depreciation charges during year	\$1,000.. ¹ 80 760
Total rental payments	\$1,000.. 50 314
Buildings and other structures	\$1,000.. 23 703
Machinery and equipment	\$1,000.. 26 611
Total other expenses ⁴	\$1,000.. 172 851
Response coverage ratio ⁵	percent.. 71
Repair and maintenance services of buildings and/or machinery ⁴	\$1,000.. 38 603
Communications services ⁴	\$1,000.. 5 725
Legal services ⁴	\$1,000.. 1 713
Accounting, auditing, and bookkeeping services ⁴	\$1,000.. 1 146
Advertising and promotional services ⁴	\$1,000.. 3 866
Expensed computer hardware and supplies and purchased computer services ⁴	\$1,000.. 1 031
Refuse removal (including hazardous waste) services ⁴	\$1,000.. 4 560
Management consulting and administrative services ⁴	\$1,000.. 3 662
Taxes and license fees ⁴	\$1,000.. 8 852
All other expenses ⁴	\$1,000.. 103 693

¹For the census, a company is defined as a business organization consisting of one establishment or more under common ownership or control.

²Includes establishments with payroll at any time during the year.

³Number of employees figures represent average number of production workers for pay period that includes the 12th of March, May, August, and November plus other employees for payroll period that includes the 12th of March.

⁴Based on Annual Survey of Manufactures (ASM) sample data.

⁵A response coverage ratio is derived for this item by calculating the ratio of the weighted employment (establishment data multiplied by sample weight) for those Annual Survey of Manufactures (ASM) establishments that reported to the weighted total employment for all ASM establishments classified in this industry.

Note 1: The amounts shown for other expenses reflect only those services that establishments purchase from other companies.

Note 2: The data in this table are based on the 2002 Economic Census and the 2002 Annual Survey of Manufactures (ASM). To maintain confidentiality, the Census Bureau suppresses data to protect the identity of any business or individual. The census results in this table contain sampling errors and nonsampling errors. Data users who create their own estimates using data from American FactFinder tables should cite the Census Bureau as the source of the original data only. For explanation of terms, see Appendix A. For full technical documentation, see Appendix C.

Table 4. Industry Statistics by Employment Size: 2002

[Data based on the 2002 Economic Census. For information on confidentiality protection, nonsampling error, and explanation of terms, see note at end of table. For meaning of abbreviations and symbols, see introductory text]

Employment size class	E ¹	All establishments ²	All employees		Production workers			Value added (\$1,000)	Total cost of materials (\$1,000)	Total value of shipments (\$1,000)	Total capital expenditures (\$1,000)
			Number ³	Payroll (\$1,000)	Number ³	Hours (1,000)	Wages (\$1,000)				
325314, Fertilizer (mixing only) manufacturing											
All establishments	1	542	10 083	340 665	6 290	13 759	179 697	1 112 499	1 982 160	3 090 683	'125 387
Establishments with—											
1 to 4 employees	4	188	e	D	D	D	D	D	D	D	'10 685
5 to 9 employees	4	102	675	20 429	465	1 065	10 841	61 139	139 178	198 511	D
10 to 19 employees	3	104	1 386	48 293	852	2 052	23 994	131 170	277 844	409 503	'13 496
20 to 49 employees	1	102	3 134	101 702	2 044	4 375	58 066	312 874	575 573	897 175	'46 142
50 to 99 employees	1	34	2 262	77 417	1 357	2 871	38 098	259 892	462 022	715 628	'28 715
100 to 249 employees	—	11	1 660	66 489	963	2 093	35 924	295 395	334 602	625 799	'16 430
250 to 499 employees	—	—	—	—	—	—	—	—	—	—	—
500 to 999 employees	—	1	f	D	D	D	D	D	D	D	D
1,000 to 2,499 employees	—	—	—	—	—	—	—	—	—	—	—
2,500 employees or more	—	—	—	—	—	—	—	—	—	—	—
Administrative records ⁴	5	147	1 002	27 753	647	1 404	13 164	55 949	160 511	213 847	'4 121

¹Some payroll and sales data for small single-establishment companies with up to 20 employees (cutoff varied by industry) were obtained from administrative records of other government agencies rather than from census report forms. These data were then used in conjunction with industry averages to estimate statistics for these small establishments. This technique was also used for a small number of other establishments whose reports were not received at the time data were tabulated. The following symbols are shown where estimated data account for 10 percent or more of the figures shown: 1—10 to 19 percent; 2—20 to 29 percent; 3—30 to 39 percent; 4—40 to 49 percent; 5—50 to 59 percent; 6—60 to 69 percent; 7—70 to 79 percent; 8—80 to 89 percent; 9—90 percent or more.

²Includes establishments with payroll at any time during the year.

³Number of employees figures represent average number of production workers for pay period that includes the 12th of March, May, August, and November plus other employees for payroll period that includes the 12th of March.

⁴Some payroll and sales data for small single-establishment companies with up to 20 employees (cutoff varied by industry) were obtained from administrative records of other government agencies rather than from census report forms. These data were then used in conjunction with industry averages to estimate statistics for these small establishments. Data are also included in respective size classes shown.

Note: The data in this table are based on the 2002 Economic Census. To maintain confidentiality, the Census Bureau suppresses data to protect the identity of any business or individual. The census results in this table contain nonsampling errors. Data users who create their own estimates using data from American FactFinder tables should cite the Census Bureau as the source of the original data only. For explanation of terms, see Appendix A. For full technical documentation, see Appendix C.

Table 5. Industry Statistics by Primary Product Class Specialization: 2002

[Data based on the 2002 Economic Census. For information on confidentiality protection, nonsampling error, and explanation of terms, see note at end of table. For meaning of abbreviations and symbols, see introductory text]

Industry or product class code	Industry or primary product class	All establishments ¹	All employees		Production workers			Value added (\$1,000)	Total cost of materials (\$1,000)	Total value of shipments (\$1,000)	Total capital expenditures (\$1,000)
			Number ²	Payroll (\$1,000)	Number ²	Hours (1,000)	Wages (\$1,000)				
325314	Fertilizer (mixing only) manufacturing .	542	10 083	340 665	6 290	13 759	179 697	1 112 499	1 982 160	3 090 683	'125 387

¹Includes establishments with payroll at any time during the year.

²Number of employees figures represent average number of production workers for pay period that includes the 12th of March, May, August, and November plus other employees for payroll period that includes the 12th of March.

Note: The data in this table are based on the 2002 Economic Census. To maintain confidentiality, the Census Bureau suppresses data to protect the identity of any business or individual. The census results in this table contain nonsampling errors. Data users who create their own estimates using data from American FactFinder tables should cite the Census Bureau as the source of the original data only. For explanation of terms, see Appendix A. For full technical documentation, see Appendix C.

Table 6a. Products Statistics: 2002 and 1997

[Includes quantity and value of products of this industry produced by (1) establishments classified in this industry (primary) and (2) establishments classified in other industries (secondary). Transfers of products of this industry from one establishment of a company to another establishment of the same company (interplant transfers) are also included. Data based on the 2002 Economic Census. For information on confidentiality protection, nonsampling error, and explanation of terms, see note 2 at end of table. For meaning of abbreviations and symbols, see introductory text]

Product code	Product	Number of companies with shipments of \$100,000 or more	Quantity of production for all purposes	Product shipments	
				Quantity	Value (\$1,000)
325314	Fertilizer (mixing only) manufacturing	2002.. N 1997.. N	X X	X X	2 854 157 2 926 500
3253140	Mixed fertilizers, mixing only	2002.. N 1997.. N	X X	X X	2 854 157 2 926 500
32531401	Mixed fertilizers, dry, mixing only	2002.. N 1997.. N	X X	X X	2 201 225 2 161 736
3253140111	Mixed fertilizers, dry, shipped in packages, tablets, and similar forms, gross weight less than or equal to 22 lb (10 kg), mixing only ¹	1,000 s tons.. 2002.. 40 1997.. 24	X X	S P1 455.8	1 124 820 478 726
3253140121	Mixed fertilizers, dry, shipped in bulk, mixing only ²	1,000 s tons.. 2002.. 48 1997.. 68	X X	S q2 845.3	364 285 632 322
3253140131	Mixed fertilizers, dry, shipped in bags, gross weight of 22 lb (10 kg) or more, mixing only ³	1,000 s tons.. 2002.. 53 1997.. 60	X X	S P2 719.6	330 894 709 149
3253140141	Potting soils, mixed with fertilizers and-or other chemicals, mixing only	1,000 s tons.. 2002.. 36 1997.. 25	X X	S 1 021.2	272 238 221 490
3253140151	Compost, mixed with chemicals and other materials for decay control, mixing only	1,000 s tons.. 2002.. 17 1997.. 12	X X	S 842.5	57 544 49 881
3253140161	Mixed plant foods, mixing only	1,000 s tons.. 2002.. 14 1997.. 13	X X	S 83.8	51 444 70 168
32531402	Mixed fertilizers, liquid, mixing only	2002.. N 1997.. N	X X	X X	288 886 294 950
3253140241	Mixed fertilizers, liquid, mixing only ⁴	1,000 s tons.. 2002.. 57 1997.. 67	X X	S P2 733.7	288 886 294 950
3253140Y	Mixed fertilizers, mixing only, nsk, total	2002.. N 1997.. N	X X	X X	364 046 469 814
3253140YWW	Mixed fertilizers, mixing only, nsk, for nonadministrative-record establishments	2002.. N 1997.. N	X X	X X	273 579 329 749
3253140YWY	Mixed fertilizers, mixing only, nsk, for administrative-record establishments	2002.. N 1997.. N	X X	X X	90 467 140 065

¹This product code is primary to more than one industry. See industry 325312, product code 3253127111.

²This product code is primary to more than one industry. See industry 325312, product code 3253127121.

³This product code is primary to more than one industry. See industry 325312, product code 3253127131.

⁴This product code is primary to more than one industry. See industry 325312, product code 3253127141.

Note 1: For some establishments, data have been estimated from central unit values that are based on quantity-value relationships of reported data. The following symbols are used when percentage of each quantity figure estimated in this manner equals or exceeds 10 percent of published figure: p-10 to 19 percent estimated; q-20 to 29 percent estimated. If 30 percent or more is estimated, figure is replaced by S.

Note 2: The data in this table are based on the 2002 Economic Census. To maintain confidentiality, the Census Bureau suppresses data to protect the identity of any business or individual. The census results in this table contain nonsampling errors. Data users who create their own estimates using data from American FactFinder tables should cite the Census Bureau as the source of the original data only. For explanation of terms, see Appendix A. For full technical documentation, see Appendix C.

Table 6b. **Product Class Shipments for Selected States: 2002 and 1997**

[Not applicable for this report.]

Table 7. Materials Consumed by Kind: 2002 and 1997

[Includes quantity and cost of materials consumed or put into production by establishments classified only in this industry. Data based on the 2002 Economic Census. For information on confidentiality protection, nonsampling error, and explanation of terms, see note 2 at end of table. For meaning of abbreviations and symbols, see introductory text]

Material code	Material consumed	Quantity	Delivered cost (\$1,000)
325314	Fertilizer (mixing only) manufacturing		
00900001	Total materials	X	1 688 821
	.....2002..	X	1 897 773
	.....1997..	S	19 650
32531103	Nitrogenous fertilizers, ammonia, synthetic anhydrous (100 percent NH ₃)	1,000 s tons ..2002..	92 216
	.....1997..	P471.5	
32531113	Nitrogenous fertilizers, ammoniating and nitrogen solutions, including ammonium nitrate and urea (100 percent N)	1,000 s tons ..2002..	46 798
	.....1997..	S	92 536
	.....1997..	S	
32531111	Nitrogenous fertilizers, ammonium nitrate (solid only) (100 percent NH ₄ NO ₃)	1,000 s tons ..2002..	28 321
	.....1997..	S	37 732
	.....1997..	P228.8	
32531107	Nitrogenous fertilizers, ammonium sulfate (100 percent (NH ₄) ₂ SO ₄)	1,000 s tons ..2002..	83 570
	.....1997..	945.6	78 117
	.....1997..	q831.3	
32531115	Nitrogenous fertilizers, urea (solid only) (100 percent CO(NH ₂) ₂)	1,000 s tons ..2002..	111 193
	.....1997..	S	129 318
	.....1997..	q779.8	
32531109	Other nitrogenous materials, including calcium cyanamide and limestone mixtures	1,000 s tons ..2002..	13 992
	.....1997..	S	59 376
	.....1997..	P200.8	
32531203	Superphosphates used in mixed goods (100 percent P ₂ O ₅)	1,000 s tons ..2002..	16 462
	.....1997..	S	54 758
	.....1997..	S	58 867
32531201	Phosphoric acid, excluding spent (100 percent P ₂ O ₅)	1,000 s tons ..2002..	141 170
	.....1997..	P651.1	
32531205	Other phosphatic fertilizer materials, including diammonium phosphate and monoammonium phosphate (100 percent P ₂ O ₅)	1,000 s tons ..2002..	98 788
	.....1997..	S	119 876
	.....1997..	S	
21239101	Muriate of potash (all grades) (60-62 percent K ₂ O)	1,000 s tons ..2002..	53 970
	.....1997..	S	81 586
	.....1997..	S	42 837
21239103	Other potassic materials, including potassium nitrate and sulfate	1,000 s tons ..2002..	46 778
	.....1997..	q259.8	
00190029	Inert fillers (including secondary plant food, soil conditioners, sand, limestone, peat, nut hulls, etc.)	1,000 s tons ..2002..	83 786
	.....1997..	S	100 442
	.....1997..	S	
32518803	Sulfuric acid, new and spent (100 percent H ₂ SO ₄)	1,000 s tons ..2002..	2 464
	.....1997..	P58.6	13 773
	.....1997..	q110.8	
21239200	Phosphate rock	1,000 s tons ..2002..	18 193
	.....1997..	S	1 603
	.....1997..	93.5	
21239303	Sulfur	1,000 l tons ..2002..	D
	.....1997..	D	D
	.....1997..	D	D
21111013	Natural gas used as a raw material	bil cu ft ..2002..	D
	.....1997..	D	D
	.....1997..	D	
32220009	Bags (including shipping sacks, multiwall bags, and polyethylene liners), excluding textile .....	.....2002..	36 335
	.....1997..	X	75 952
	.....1997..	X	
00970099	All other materials and components, parts, containers, and supplies .....	.....2002..	579 112
	.....1997..	X	405 660
	.....1997..	X	
00971000	Materials, ingredients, containers, and supplies, nsk .....	.....2002..	392 286
	.....1997..	X	354 861
	.....1997..	X	

Note 1: For some establishments, data have been estimated from central unit values that are based on quantity-value relationships of reported data. The following symbols are used when percentage of each quantity figure estimated in this manner equals or exceeds 10 percent of published figure: p-10 to 19 percent estimated; q-20 to 29 percent estimated. If 30 percent or more is estimated, figure is replaced by S.

Note 2: The data in this table are based on the 2002 Economic Census. To maintain confidentiality, the Census Bureau suppresses data to protect the identity of any business or individual. The census results in this table contain nonsampling errors. Data users who create their own estimates using data from American FactFinder tables should cite the Census Bureau as the source of the original data only. For explanation of terms, see Appendix A. For full technical documentation, see Appendix C.